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Dual nature of electron spin resonance in YbCo2Zn20 intermetallic compound

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Abstract

In single crystals of YbCo2Zn20 intermetallic compound, two coexisting types of electron spin resonance signals related to the localized magnetic moments of cobalt and to itinerant electrons have been observed in the 4.2-300 K temperature range. It is shown that the relative contribution of itinerant electrons to the total magnetization does not exceed 9%. We argue that the electron dynamics in YbCo2Zn20 and YbCuAl heavy fermion systems is determined by the effects produced by the magnetic subsystem of the localized 3d-electrons. We also discuss general aspects of the electron spin resonance spectroscopy in underdoped ytterbium-based intermetallics and the spectral manifestations of the interplay between the efficiency of the hybridization of f-electrons with the electrons filling outer atomic shells, crystal field effects, and the effects related to the proximity to the quantum critical point. © Pleiades Publishing, Ltd., 2014.

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